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(54) 【考案の名称】 自転車用発電機内装ハブ

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(57) 【実用新案登録請求の範囲】

【請求項 1】 コイル軸芯がハブ軸芯 (6) と同芯状に位置する発電コイル (7) と、磁石体 (8) とを有する発電機単位体 (D 1、D 2、D 3) の複数個を、ハブ体 (2) の内側にハブ軸芯方向に並列して備え、

前記発電機単位体 (D 1、D 2、D 3) それぞれの前記磁石体 (8) を前記発電コイル (7) の外周側に配置し、

前記発電コイル (7) の外周囲にコイル周方向に分散して位置し、前記ハブ軸芯 (6) の一方側方向に延びる多数の磁極片 (1 2 a) が備えられた鉄芯部材 (1 2)

と、前記発電コイル (7) の外周囲コイル周方向に分散して位置し前記一方側方向とは反対側方向に延びる多数の磁極片 (1 2 b) が備えられた別の鉄芯部材 (1 2) を、前記発電コイル (7) の各々に対向した状態で設け

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ることを特徴とする自転車用発電機内装ハブ。

【請求項 2】 前記磁石体 (8) が、ハブ軸芯方向に並列する全ての前記発電機単位体 (D 1、D 2、D 3) のうちの最もハブ体一端側に位置するもの (D 1) から最もハブ体他端側に位置するもの (D 3) までに至るハブ軸芯方向長さを備えて、全ての前記発電機単位体 (D 1、D 2、D 3) における磁石体を形成している請求項 1 記載の自転車用発電機内装ハブ。

【請求項 3】 前記鉄芯部材 (1 2) のいずれにおいても前記磁極片 (1 2 a)、(1 2 b) の前記鉄芯部材 (1 2) に連結する基端側でのコイル周方向での長さ (L 1) が先端側でのコイル周方向での長さ (L 2) より大であり、

前記一方側方向に延びる前記磁極片 (1 2 a) の前記先端側と、前記反対側方向に延びる前記磁極片 (1 2 b)

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の前記先端側が前記コイル周方向に交互に配置され、これらがお互いに噛み合うように配置されている請求項1又は2記載の自転車用発電機内装ハブ。

【請求項4】前記発電コイル(7)よりのリード線(9)を前記ハブ体(2)の外側に導くために、前記ハブ軸(5)の外周に凹入溝部(5a)が形成されている請求項1から4のいずれかに記載の自転車用発電機内装ハブ。

【考案の詳細な説明】

【0001】

【産業上の利用分野】本考案は、発電コイルと磁石とを備える発電機を、ハブ体の内側に備えるとともに、ハブ体の回転力によって駆動されるように構成してある自転車用発電機内装ハブに関する。

【0002】

【従来の技術】上記発電機内装ハブとして、従来、例えば特開平3-258673号公報に示されるように、ハブ体の回転力を遊星式増速機構により増速して回転式磁石に伝達し、発電機がハブ体の回転速度より高速で回転するように構成することより、コイルや磁石を小型に形成したり、安価な磁石を採用しても、比較的高い電圧で発電することが可能なものがあった。また、例えば特開昭57-71257号公報に示されるように、発電コイルや磁石の外径を大きく形成し、磁極片を多量の磁束が通過するように大きく形成するとともに多数備えて、磁石が備える磁力を無駄が少ないように有効に利用できるように構成することにより、発電機がハブ体の回転速度で回転しても、比較的高い電圧で発電することが可能なものがあった。

【0003】

【考案が解決しようとする課題】前者の場合、増速機構自体が作動抵抗を備えることから、この抵抗のために走行時での駆動負荷が増大し、ペダル操作に要する労力の割には走行スピードが出ないとか、照明が十分な明るさになりにくい不利があった。後者の場合、コイルや磁石が大きいために発電機が大型になり、この結果、ハブ体の外径がハブ体全体にわたって大きくなるか、あるいは、ハブ体の発電機が位置しない部分での外径が小さくなくても、発電機が位置している部分での外径が大きくなって取扱がしにくいとか、外観面で不利なハブになっていた。本考案の目的は、駆動力ロスを少なくしながら比較的高い電圧で発電するとか、故障のために発電不能になることを少なくすることが可能で、しかも、コンパクトでシンプルに、かつ、安価に得られる自転車用発電機内装ハブを提供することにある。

【0004】

【課題を解決するための手段】本考案による自転車用発電機内装ハブにあっては、目的達成のために、コイル軸芯がハブ軸芯と同芯状に位置する発電コイルと、磁石体とを有する発電機単位体の複数個を、ハブ体の内側にハ

ブ軸芯方向に並列して備え、前記発電機単位体それぞれの前記磁石体を前記発電コイルの外周側に配置し、前記発電コイルの外周囲にコイル周方向に分散して位置し、前記ハブ軸芯の一方側方向に延びる多数の磁極片が備えられた鉄芯部材と、前記発電コイルの外周囲コイル周方向に分散して位置し前記一方側方向とは反対側方向に延びる多数の磁極片が備えられた別の鉄芯部材を、前記発電コイルの各々に対向した状態で設けることを特徴とする。

10 【0005】

【作用】ハブ体の内部に発電機を備えるに、発電コイルがハブ軸芯と同芯状に位置すると、平行などの別軸芯で位置するに比し、発電コイルの外径が同じであっても、ハブ体内空間の直径を小にしながら発電機装備ができる。ハブ体の小径化ができるように発電機の小型化を図りながら、発電機をハブ体内に配置するに当たり、発電機全体が一つの発電機単位体でなる場合には、磁石のハブ軸芯方向での長さをできるだけ長くして、磁石が極力強い磁力を備えるようにしても、磁石が備える磁力の強

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さの割りには高い電圧の発電ができない。すなわち、発電コイルのハブ軸芯方向での長さが長くなることから、

発電コイルに備える磁極片のハブ軸芯方向での長さを大にして、磁極片が磁石から多量の磁束を受けるようにできる。ところが、磁極片が受ける磁束の全てまたはそれに近い量がコイル側に通過するようにするには、磁極片が鉄芯部材に連結する箇所のコイル周方向での長さを長くする必要があつてコイルの外径が大になる。しかしながら、発電機の小型化のためにはコイル外径を大きくできないことから、磁極片の前記連結箇所のコイル周方向

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での長さを充分には長くできず、磁極片が磁石から多量の磁束を受けても、コイル側に通過する磁束の量が少なくなる。これに対し、発電機全体がハブ軸芯方向に並ぶ複数の発電機単位体でなると、発電機全体としては、複数の発電コイルを備えることになる。発電機全体として備える磁石が、発電機単位体が各別に備える複数の磁石でなる場合と、複数の発電機単位体に共用の同一の磁石でなる場合のいずれにおいても、発電機全体としては同じ強さの磁力を備えるものとして考える。すると、それぞれの発電コイルに備える磁極片のハブ軸芯方向での長さ

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が短くなるが、そのハブ軸芯方向での長さを、発電機の小型化の面から決まる磁極片の鉄芯部材連結箇所のコイル周方向での長さに釣り合う長さ、または、それに近い長さにできる。この結果、各磁極片は発電機全体として備えている磁束量のうちの一部しか受けないことになっても、磁極片それぞれが受ける磁束の全量またはそれに近い量がコイル側に通過するようにできる。すなわち、発電機全体としては、発電機全体として備える磁束の全量またはそれに近い量が発電コイルを通過し、発電機全体としての磁力を無駄がないとか、無駄が少ないように有効に利用して発電できる。その上、磁石が発電コ

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イルの外周側に位置すると、磁石の外周側に発電コイルが位置するに比し、発電機の外径が同一であると考え、発電コイルの外径と内径との差が大きくなって発電コイルの巻き数を多くできる。また、発電コイルの磁極片を発電コイルの外周側に備えることになるために、磁極片のコイル周方向での長さを比較的長くしたり、磁極片のコイル周方向に並ぶ数量を比較的多くし、この面からも、発電コイルを通過する磁束量を多くできる。したがって、本考案構成の場合、発電機単位体それぞれの発電コイルを電氣的に直列に接続すると、発電機全体としては、発電機単位体それぞれが磁力を有効に利用して発電する電力を合成して出力することになる。これにより、発電機単位体がハブ体の回転速度と同じ回転速度で回転するようにしても、発電機全体としては、その大きさの割には高い電圧で発電することになる。また、発電機単位体それぞれの発電コイルを電氣的に並列に接続すると、例えば一部の発電機単位体の発電コイルに断線が発生してその発電機単位体が発電しなくなっても、他の発電機単位体が発電作動し、発電機全体としては発電を継続して行うことになる。

【 0 0 0 6 】

【考案の効果】発電機を増速駆動することなく比較的高い電圧で発電できることにより、ペダル操作力を走行駆動や発電機駆動に無駄なく有効に利用して明るく照明しながら、走行速度を落とすことなく比較的楽に走行することを可能にできた。また、発電機単位体が各別に出力するようにできることにより、発電機の一部に故障が生じて、照明が不能にはならなくて走行可能なように構成できる有利なものにできた。その上、磁石が備える磁力をロスが少ないように有効に利用して比較的高い電圧で発電できることにより、比較的安価な磁石を採用して経済面で有利に得られるようにできた。しかも、発電機全体を比較的小型に形成できることにより、ハブ体を小型でシンプルに形成して組み立てや運搬などが取扱面からしやすいようにでき、さらには、体裁がよくて違和感のない商品価値が高い状態に組み付けることを可能にできた。

【 0 0 0 7 】

【実施例】図 1 に示すように、一対のハブ鏢 1、1 を備えるハブ体本体 2 a と、このハブ体本体 2 a の一端側に取り付けられたハブキャップ 2 b とで成るハブ体 2 を、ボール 3、玉押し 4 を介してハブ軸 5 に回転可能に取り付けてある。ハブ体 2 の内部に設ける発電機配置用スペースが極力小スペースで済むように、前記ハブ軸 5 の軸芯 6 と同芯状に、かつ、ハブ軸芯 6 の方向に並列するように配置した三つの発電コイル 7・・・この発電コイル 7 の外周側に配置した筒状磁石体 8 などを有する発電機を、前記ハブ体 2 の内側に備え、もって、自転車用発電機内装ハブを構成してある。

【 0 0 0 8 】前記発電機は、三つの前記発電コイル 7・

・を各別に備える三つの発電コイル体のうちの最もハブ体一端側に位置する発電コイル体と、前記筒状磁石体 8 とで成る第 1 発電機単位体 D 1、三つの前記発電コイル体のうちの中央に位置する発電コイル体と、前記筒状磁石体 8 とで成る第 2 発電機単位体 D 2、三つの前記発電コイル体のうちの最もハブ体他端側に位置する発電コイル体と、前記筒状磁石体 8 とで成る第 3 発電機単位体 D 3 のそれぞれで成る。そして、車体走行に伴ってハブ体 2 が回転すると、発電機単位体 D 1 ～ D 3 がハブ体回転力のために発電作動することによって発電するように構成し、発電コイル体からハブ軸 5 の凹入溝部 5 a と、一方の前記玉押し 4 の内側とを通過してハブ体 2 の外側に延びるリード線 9 により、発電電力を前照灯（図示せず）に供給するように構成してある。すなわち、三つの発電コイル体を複数本の連結ピン 1 0 によって締め付け連結し、ハブ軸 5 の前記凹入溝部 5 a の端部に入り込むことによってハブ軸 5 に係合している回転止め具 1 1 が、第 3 発電機単位体 D 3 の発電コイル体を構成している鉄芯部材 1 2 にも係合して、この発電コイル体のハブ軸 5 に対する回転止めを行うように構成することにより、全ての発電コイル体をハブ軸 5 に対して回転しないように固定してある。そして、発電機内装ハブを使用する際には、ハブ軸 5 を自転車用車体 F に対して締め付け固定して回転しないようにすることから、全ての発電コイル体は自転車用車体 F に対して回転しないように固定することになる。筒状磁石体 8 は、図 8 に示す円弧状磁石片 8 a の 4 個で成り、この磁石片 8 a を、図 1 に示すように、ハブ体本体 2 a の内側にハブ軸芯 6 と同芯状に位置する純鉄製の筒型バックヨーク 1 3 の内側にハブ体周方向に環状に並置し、ハブ体 2 の一端側に位置する磁石固定リング 1 4 と、前記ハブキャップ 2 b とで前記バックヨーク 1 3 と共にハブ体本体 2 a に固定することによって形成してある。そして、ハブ体 2 が回転すると、筒状磁石体 8 は、前記磁石固定リング 1 4 とハブキャップ 2 b とによる固定作用のためにハブ体 2 と一体に回転する。つまり、ハブ体 2 が回転すると、筒状磁石体 8 がハブ体回転力のためにハブ体 2 の回転速度と同じ回転速度で全ての発電コイル体に対して回転する。前記発電機単位体 D 1 ～ D 3 それぞれの発電コイル体は、前記発電コイル 7 と、図 2 および図 3 に示す如きポリプロピレン樹脂製のコイル用ボビン 1 5 と、図 3 および図 5 に示す如き純鉄製の前記鉄芯部材 1 2 の 2 個とで成り、これらを図 6 に示す如く組み合わせるとともに前記連結ピン 1 0 によって締め付け固定することによって形成してある。一対の前記鉄芯部材 1 2、1 2 のいずれにも、前記発電コイル 7 の外周側にコイル周方向に分散して位置する 1 6 個の磁極片 1 2 a・・・または 1 2 b・・・を備えるとともに、一方の鉄芯部材 1 2 が備える磁極片 1 2 a と、他方の鉄芯部材 1 2 が備える磁極片 1 2 b とが図 7 に示す如く適当な磁極片間隔を隔てて噛み合うように、一対の

鉄芯部材12, 12を組み合わせることにより、発電コイル7の外周側に、コイル周方向に分散する32個の磁極片12a, 12bを備えてある。4個の前記磁石片8aそれぞれの内面側に、図9に示す如くN極とS極とが交互に並ぶ8極の磁極を備えることにより、筒状磁石体8の内周面側に、磁石体周方向にN極とS極とが交互に並ぶ32極の磁極を備えてある。筒状磁石体8の回転が1ピッチ角進む毎に、筒状磁石体8の16極のN極と、発電コイル7の一方の鉄芯部材12が備える16個の磁極片12aとが各別に対向し、筒状磁石体8の16極のS極と、発電コイル7の他方の鉄芯部材12が備える16個の磁極片12bとが各別に対向する第1対向状態と、この第1対向状態とは逆に、筒状磁石体8の16極のN極と、発電コイル7の他方の鉄芯部材12が備える16個の磁極片12bとが各別に対向し、筒状磁石体8の16極のS極と、発電コイル7の一方の鉄芯部材12が備える16個の磁極片12aとが各別に対向する第2対向状態とに磁石側磁極とコイル側磁極片の対向状態が変化するように、磁極の配列設定をしてあることにより、ハブ体2が回転して筒状磁石体8が回転するに伴って、第1発電機単位体D1～第3発電機単位体D3が各別に発電する。すなわち、筒状磁石体8が回転して磁石側磁極とコイル側磁極片とが前記第1対向状態になると、筒状磁石体8からの磁束が一方の磁極片12aに受入れられる。そして、両鉄芯部材12, 12の図4の如きボス部12cが発電コイル7の内側で接触していることにより、磁束が他方の磁極片12bの方に両鉄芯部材12を通過する。つまり、筒状磁石体8からの磁束が発電コイル7を正方向に通過する。磁石側磁極とコイル側磁極片とが前記第2対向状態になると、筒状磁石体8からの磁束が他方の磁極片12bに受入れられて一方の磁極片12aの方に両鉄芯部材12を通過することにより、磁石体8からの磁束が発電コイル7を逆方向に通過する。そして、筒状磁石体8が回転するに伴い、磁石側磁極とコイル側磁極片が前記第1対向状態と前記第2対向状態とに交互に切り換わって磁束が発電コイル7を通過する方向が正方向と逆方向とに切り換わることにより、第1発電機単位体D1～第3発電機単位体D3それぞれの発電コイル7に電力が発生する。第1発電機単位体D1～第3発電機単位体D3それぞれの発電コイル7を電氣的に直列に接続し、発電機全体としては、第1発電機単位体D1～第3発電機単位体D3が各別に発電する電力よりも高い電圧の電力を前記リード線9から送り出すようにしてある。すなわち、第1発電機単位体D1～第3発電機単位体D3が各別に発電する電力を合成し、第1発電機単位体D1～第3発電機単位体D3それぞれが発電する電圧よりも高い電圧を備える合成電力を発電電力として送り出すのである。

【0009】上記実施構造にあっては、磁石体8を発電コイル7の外周側に配置している。これにより、磁石体

が発電コイルの内周側に配置するに比し、ハブ体内の発電機配置用スペースが同じと考えると、発電コイル7の外径と内径との差を大にし、コイルの巻き数を多くしてより高い発電電圧が得られる。また、磁極片12a, 12bを発電コイル7の外周側に備えるようになることから、磁極片12a, 12bのコイル周方向での長さや数量を大にして、磁石体8からの磁束が発電コイル7側に有利に通過するようにできる。

【0010】上記実施構造にあっては、磁石体8のハブ軸芯方向長さを第1発電機単位体D1から第3発電機単位体D3までに至る長さに形成してある。すなわち、同一の磁石体8を第1発電機単位体D1～第3発電機単位体D3それぞれのための磁石体に共用することによって、構造の簡略化を図ってある。この他、第1発電機単位体D1～第3発電機単位体D3にそれぞれ専用の磁石体を各別に備えて実施してもよい。

【0011】前記発電コイル7の磁極片12a, 12bを形成するに、図7に明示するように、磁極片12a, 12bの鉄芯部材12に連結する基端側のコイル周方向での長さL1を、先端側でのコイル周方向での長さL2より大に形成してある。すなわち、基端側の長さL1と先端側での長さL2を同じにするに比し、コイル周方向に並ぶ磁極片12a, 12bを数多く設けることを可能とし、しかも、磁極片12a, 12bが磁石体8から受ける磁束が発電コイル7側に通過するための磁極片基端側での通路が、磁極片先端側の磁束受け面積の割りには大になって、磁極片12a, 12bが受け入れる磁束の全量またはそれに近い量がコイル側を通過することを可能にしてある。

【0012】〔別実施例〕

上記実施構造に替え、図10に示すように、第1発電機単位体D1～第3発電機単位体D3それぞれの発電コイル7を並列に接続して実施してもよい。この場合、第1発電機単位体D1～第3発電機単位体D3のいずれか一つまたは二つに断線が発生しても、断線していない他の発電機単位体による発電電力を取り出し、照明を継続して行うことが可能になる。

【0013】尚、実用新案登録請求の範囲の項に図面との対照を便利にするために符号を記すが、該記入により本考案は添付図面の構成に限定されるものではない。

【図面の簡単な説明】

- 【図1】自転車用発電機内装ハブの断面図
- 【図2】コイル用ボビンの断面図
- 【図3】コイル用ボビンの側面図
- 【図4】鉄芯部材の断面図
- 【図5】鉄芯部材の側面図
- 【図6】発電コイル体の断面図
- 【図7】磁極片の平面図
- 【図8】筒状磁石体の断面図
- 【図9】磁極配列の説明図

9

10

【図 10】別実施発電機の電気回路図

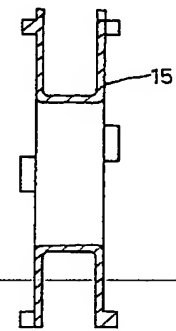
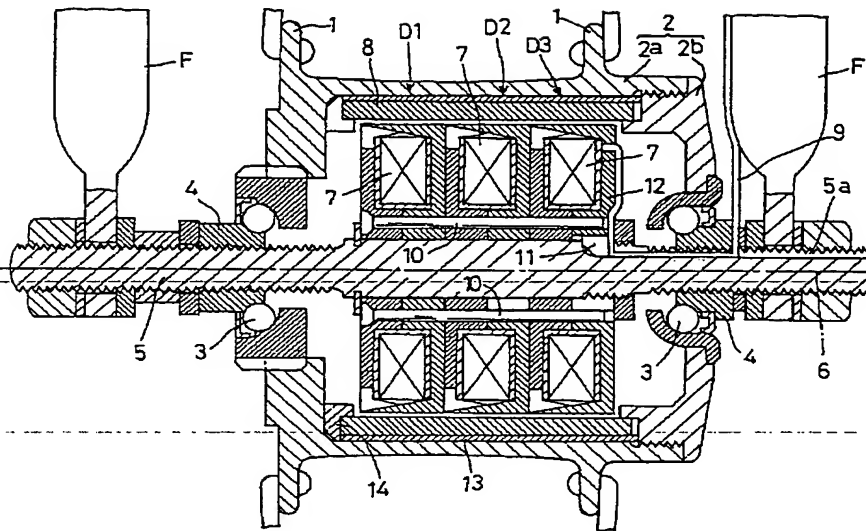
【符号の説明】

- 2 ハブ体
6 ハブ軸芯
7 発電コイル
8 磁石体

- 1 2 鉄芯部材
1 2 a, 1 2 b 磁極片
D 1, D 2, D 3 発電機単位体
L 1 基端側長さ
L 2 先端側長さ

【図 1】

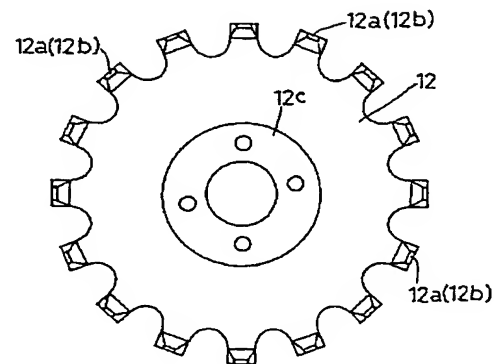
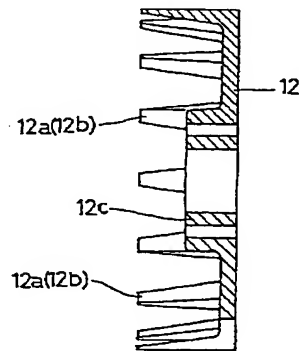
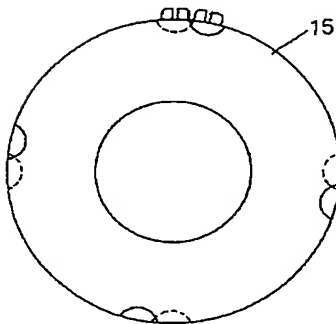
【図 2】



【図 3】

【図 4】

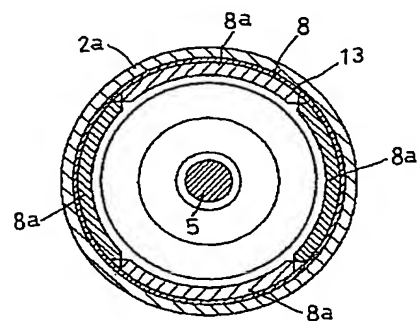
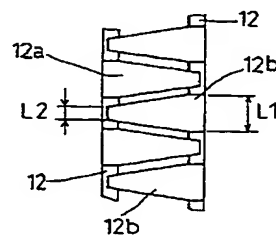
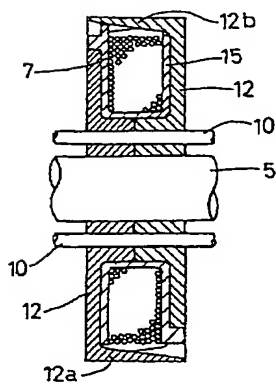
【図 5】



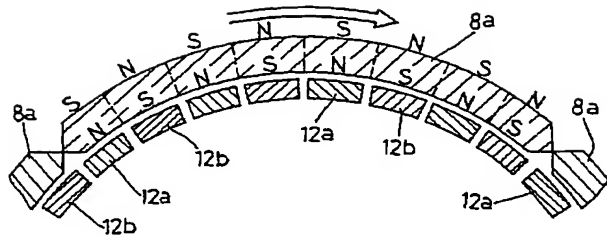
【図 6】

【図 7】

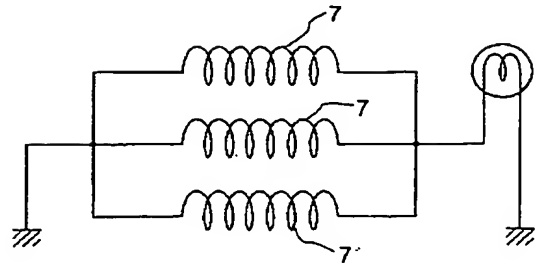
【図 8】



【図9】



【図10】



1. JP.2603339.Y

Hub having a DC generator arranged therein**Patent number:** JP6075978U**Publication date:** 1994-10-25**Inventor:****Applicant:****Classification:****- International:** *B60B27/00; B62J6/12; H02K21/22; B60B27/00; B62J6/00; H02K21/22; (IPC1-7): B62J6/12***- european:** B60B27/00; B62J6/12; H02K21/22C**Application number:** JP19930016642U 19930405**Priority number(s):** JP19930016642U 19930405**Also published as:**

FR2703650 (A1)

DE4411145 (A1)

JP2603339Y (Y2)

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Abstract not available for JP6075978U

Abstract of corresponding document: **DE4411145**

A cycle wheel hub (2) having a DC generator arranged in it has a hub spindle (5) which is attached to frame parts (F) of the cycle and runs between a first end and a second end, as well as a first coil arrangement (7) which is supported on the hub spindle (5) and around which a wire (9) is wound, coaxially with respect to the hub spindle (5). In addition, a large number of magnets (8; 8a) are arranged radially outside the coil arrangement (7) such that they can be rotated relative to said coil arrangement (7), the magnets (8; 8a) having magnetic poles which are aligned radially with respect to the coil arrangement (7). This cycle wheel hub (2) additionally has a second coil arrangement which is supported on the hub spindle (5) alongside the first coil arrangement and around which a wire (9) is wound, coaxially with respect to the hub spindle (5).

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CLAIMS

(57) [Utility model registration claim]

[Claim 1] The magneto coil with which a coil axis is concentrically located with a hub axis (6) (7), The plurality of the generator unit (D1, D2, D3) which has a magnet object (8) the inside of a hub shell (2) -- the direction of a hub axis -- standing in a row -- having -- said generator unit (D1, D2, D3) -- said each magnet object (8) -- said magneto coil It arranges to the periphery side of (7). The iron core member which it was dispersedly located in the periphery enclosure of said magneto coil (7) in the coil hoop direction, and was equipped with many pole pieces (12a) of said hub axis (6) prolonged in a side direction on the other hand (12). The generator interior hub for bicycles characterized by preparing another iron core member (12) equipped with the pole piece (12b) of a large number which are distributed and located in the periphery enclosure coil hoop direction of said magneto coil (7), and are prolonged in the direction of the opposite side with the direction of said one side where each of said magneto coil (7) is countered. [Claim 2] It has the direction die length of a hub axis in which said magnet object (8) results by what is most located in a hub-shell other end side from the thing (D1) of said all generator units (D1, D2, D3) arranged in parallel in the direction of a hub axis most located in a hub-shell end side (D3). The generator interior hub for bicycles according to claim 1 which forms the magnet object in said all generator units (D1, D2, D3).

[Claim 3] The die length (L1) in the coil hoop direction by the side of the end face connected with said pole piece (12a) and said iron core member (12) of (12b) also in any of said iron core member (12) is size from the die length (L2) in the coil hoop direction by the side of a tip. Claim 1 which said tip side of said pole piece (12b) prolonged in said direction of the opposite side said tip side of said pole piece (12a) prolonged in the direction of said one side is arranged by turns in said coil hoop direction, and is arranged so that these may gear to each other Or generator interior hub for bicycles given in two.

[Claim 4] claim 1 by which the reentrant slot (5a) is formed in the periphery of said hub spindle (5) in order to lead the lead wire (9) from said magneto coil (7) to the outside of said hub shell (2) from -- generator interior hub for bicycles given in either of 4.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed explanation of a design]

[0001]

[Industrial Application] This design is related with the generator interior hub for bicycles constituted so that it may drive according to the rotation force of a hub shell while it is equipped with a generator equipped with a magneto coil and a magnet inside a hub shell.

[0002]

[Description of the Prior Art] The rotation force of a hub shell was accelerated according to the planet type speed-increasing-system, and it transmitted to the rotation-type magnet so that it might be shown in the former, for example, JP,3-258673,A, as the above-mentioned generator interior hub, and even if it formed the coil and the magnet small from constituting so that a generator may rotate from the rotational speed of a hub shell at high speed or adopted the cheap magnet, there was what has possible generating electricity on a comparatively high electrical potential difference. Moreover, while the outer diameter of a magneto coil or a magnet was formed greatly, and forming greatly so that a lot of magnetic flux might pass a pole piece as shown, for example in JP,57-71257,A, even if the generator rotated with the rotational speed of a hub shell by constituting the magnetism with which is equipped with and a magnet is equipped so that there may be little futility and it can use effectively, there was what has possible generating electricity on a comparatively high electrical potential difference.

[0003]

[Problem(s) to be Solved by the Device] Since the speed-increasing system itself was equipped with actuation resistance in the case of the former, the drive load in the time of transit increased for this resistance, and there was disadvantage from which transit speed does not come out considering the effort which pedal actuation takes, or lighting cannot become sufficient brightness easily. When the outer diameter in the part in which the generator is located even if the outer diameter in the part in which in the case of the latter a generator becomes large-sized since a coil and the magnet are large, consequently the outer diameter of a hub shell becomes large over the whole hub shell, or the generator of a hub shell is not located becomes small becomes large and it was hard to carry out handling, it had become a hub disadvantageous in respect of an appearance. The purpose of this design can lessen generating electricity on a comparatively high electrical potential difference, or becoming generation-of-electrical-energy impossible for failure, lessening a driving force loss, moreover, is compact and is to offer the generator interior hub for bicycles obtained simply and cheaply.

[0004]

[Means for Solving the Problem] If it is in the generator interior hub for bicycles by this design The magneto coil with which a coil axis is concentrically located with a hub axis for the purpose achievement, It arranges in parallel and has the plurality of the generator unit which has a magnet object in the direction of a hub axis inside a hub shell. The iron core member which said magnet object of each of said generator unit has been arranged to the periphery side of said magneto coil, and it was dispersedly located in the periphery enclosure of said magneto coil in the coil hoop direction, and was equipped with many pole pieces of said hub axis prolonged in a side direction on the other hand, It is characterized by preparing another iron core member equipped with the pole piece of a large number which are distributed and located in the periphery enclosure coil hoop direction of said magneto coil, and are prolonged in the direction of the opposite side with the direction of said one side, where each of said magneto coil is countered.

[0005]

[Function] If a magneto coil is concentrically located in equipping the interior of a hub shell with a generator with a hub axis, it compares with being located by which parallel another axis, and even if the

outer diameter of a magneto coil is the same, generator equipment can be performed, making the diameter of hub inside-of-the-body space into smallness. When the whole generator becomes by one generator unit, even if in arranging a generator to the hub inside of the body it lengthens the die length in the magnetic direction of a hub axis as much as possible and a magnet is equipped with strong magnetism as much as possible, attaining the miniaturization of a generator so that minor diameter-ization of a hub shell can be performed, a generation of electrical energy of a high electrical potential difference is not made considering the strength of the magnetism with which a magnet is equipped. That is, since the die length in the direction of a hub axis of a magneto coil becomes long, the die length in the direction of a hub axis of the pole piece with which a magneto coil is equipped is made into size, and a pole piece can receive a lot of magnetic flux from a magnet. However, in order to make it the amount near all the magnetic flux or it which a pole piece receives pass to a coil side, it is necessary to lengthen the die length in the coil hoop direction of the part which a pole piece connects with an iron core member, and the outer diameter of a coil becomes size. However, since a coil outer diameter cannot be enlarged for the miniaturization of a generator, even if it cannot lengthen the die length in the coil hoop direction of said connection part of a pole piece enough but a pole piece receives a lot of magnetic flux from a magnet, the amount of the magnetic flux passed to a coil side decreases. On the other hand, when the whole generator becomes by two or more generator units located in a line in the direction of a hub axis, as the whole generator, it will have two or more magneto coils. Also in any in the case where the magnet which it has as the whole generator becomes with two or more magnets with which a generator unit equips each **, and the case of becoming two or more generator units with the same common magnet, it thinks as a thing equipped with the magnetism of the strength same as the whole generator. Then, although the die length in the direction of a hub axis of the pole piece with which each magneto coil is equipped becomes short, the die length in the direction of a hub axis is made to the die length which balances with the die length in the coil hoop direction of the iron core member connection part of the pole piece decided from the field of a miniaturization of a generator, or the die length near it. Consequently, even if each pole piece will not receive only the part of the amounts of magnetic flux which it has as the whole generator, the whole quantity of the magnetic flux which each pole piece receives, or the amount near it can pass it to a coil side. That is, as the whole generator, the whole quantity of the magnetic flux which it has as the whole generator, or the amount near it passes a magneto coil, in if there is no futility, it uses effectively and futility can generate the magnetism as the whole generator so that it may be few. If a magnet is moreover located in the periphery side of a magneto coil, a magneto coil will compare with a magnetic periphery side in being located, if it thinks that the outer diameter of a generator is the same, the difference of the outer diameter of a magneto coil and a bore will become large, and the number of turns of a magneto coil can be made [many]. Moreover, since the periphery side of a magneto coil will be equipped with the pole piece of a magneto coil, the die length in the coil hoop direction of a pole piece is lengthened comparatively, or quantity on a par with the coil hoop direction of a pole piece is made [many / comparatively], and the amount of magnetic flux which passes a magneto coil can be made [many] also from this field. Therefore, when the magneto coil of each generator unit is electrically connected to a serial in this configuration, as the whole generator, each generator unit will compound and output the power generated using magnetism effectively. Even if it makes it a generator unit rotate with the same rotational speed as the rotational speed of a hub shell by this, as the whole generator, it will generate electricity on a high electrical potential difference considering the magnitude. Moreover, if the magneto coil of each generator unit is electrically connected to juxtaposition, even if an open circuit occurs, for example in the magneto coil of a part of generator units and the generator unit stops generating electricity, generation-of-electrical-energy actuation is carried out, and as the whole generator, other generator units will continue and will perform a generation of electrical energy.

[0006]

[Effect of the Device] It made it possible to run comparatively comfortably, without reducing a travel speed, illuminating [without carrying out the accelerating drive of the generator] brightly by the ability generating electricity on a comparatively high electrical potential difference using a pedal operating physical force effectively [there is no futility in a transit drive or a generator drive, and]. Moreover, when a generator unit was able to output to each **, even if failure arose in some generators, it was made to the advantageous thing which can be constituted so that lighting may not become impossible and it can run. When a loss used effectively the magnetism with which a magnet is equipped and was moreover able to generate it on a comparatively high electrical potential difference so that it may be few, a comparatively cheap magnet is adopted and it could be advantageously obtained on the financial side. And by the ability forming the whole generator comparatively small, the hub shell was formed that it is small and simply, it could be easy to carry

out an assembly, conveyance, etc. from the handling side, and the commodity value which is still more decent and does not have sense of incongruity made it possible to attach to a high condition.

[0007]

[Example] As shown in drawing 1, the hub shell 2 which changes with hub-shell body 2a equipped with hub ** 1 and 1 of a pair and hubcap 2b attached in the end side of this hub-shell body 2a is attached in the hub spindle 5 rotatable through a ball 3 and the ball push 4. the tooth space for generator arrangement provided for the interior of a hub shell 2 can be managed with a small tooth space as much as possible -- as - the axis 6 of said hub spindle 5 -- concentrically -- and three magneto coils 7 arranged so that it may stand in a row in the direction of the hub axis 6 -- it has and has the generator which has the tubed magnet object 8 arranged to the .. and periphery side of this magneto coil 7 inside said hub shell 2, and the generator interior hub for bicycles is constituted.

[0008] said generator -- said three magneto coils 7 -- with the magneto-coil object of the three magneto-coil objects which equip each ** with .. most located in a hub-shell end side The magneto-coil object located in the center of said magneto-coil objects of the 1 or 3 1st generator units D which change with said tubed magnet object 8, It changes by each of the 3rd generator unit D3 which changes with the magneto-coil object of said magneto-coil objects of the 2 or 3 2nd generator units D which change with said tubed magnet object 8 most located in a hub-shell other end side, and said tubed magnet object 8. And if a hub shell 2 rotates with car-body transit, it constitutes so that it may generate electricity, when the generator units D1-D3 carry out generation-of-electrical-energy actuation for the hub-shell rotation force, and the lead wire 9 prolonged-on-the-outside-of-a-hub-shell-2-through-reentrant-slot-5a-of-a-hub-spindle-5-and-one-inside-of-said-ball push 4 from a magneto-coil object constitutes so that generated output may be supplied to a headlight (not shown). Namely, three magneto-coil objects are bound tight and connected by two or more connection pins 10. The rotation stops 11 which are engaging with the hub spindle 5 by entering the edge of said reentrant slot 5a of a hub spindle 5 engage also with the iron core member 12 which constitutes the magneto-coil object of the 3rd generator unit D3. By constituting so that niting to the hub spindle 5 of this magneto-coil object may be performed, it has fixed so that no magneto-coil objects may be rotated to a hub spindle 5. And since a hub spindle 5 is bound tight to the car body F for bicycles, and it fixes and is made not to rotate in case a generator interior hub is used, all magneto-coil objects will be fixed so that it may not rotate to the car body F for bicycles. As the tubed magnet object 8 changes by four of piece of circular magnet 8a shown in drawing 8 and is shown in drawing 1, this piece of magnet 8a The magnet stop ring 14 which juxtaposes annularly in a hub-shell hoop direction inside [which is concentrically located with the hub axis 6 inside hub-shell body 2a] the telescopic back yoke 13 made of pure iron, and is located in the end side of a hub shell 2, It has formed by fixing to hub-shell body 2a with said back yoke 13 with said hubcap 2b. And if a hub shell 2 rotates, the tubed magnet object 8 will rotate to a hub shell 2 and one for the fixed operation by said magnet stop ring 14 and hubcap 2b. That is, if a hub shell 2 rotates, the tubed magnet object 8 will rotate to all magneto-coil objects with the rotational speed same for the hub-shell rotation force as the rotational speed of a hub shell 2. said generator units D1-D3 -- each magneto-coil object changes by said magneto coil 7, the bobbin 15 for coils made of the **** polypropylene resin shown in drawing 2 and drawing 3, and 2 of said iron core member 12 made of the **** pure iron shown in drawing 3 and drawing 5, and it is formed by binding tight and fixing by said connection pin 10 while combining, as these are shown in drawing 6. 16 pole piece 12a distributed and located in the periphery enclosure of said magneto coil 7 in a coil hoop direction at all of said iron core members 12 and 12 of a pair .. or 12b, while having .. So that suitable pole piece spacing may be separated and it may gear, as pole piece 12a with which one iron core member 12 is equipped, and pole piece 12b with which the iron core member 12 of another side is equipped show drawing 7 The periphery enclosure of a magneto coil 7 is equipped with 32 pole pieces 12a and 12b distributed to a coil hoop direction by combining the iron core members 12 and 12 of a pair. piece of said four magnets 8a -- N pole and the south pole equip the inner skin side of the tubed magnet object 8 with the magnetic pole of 32 poles located in a line by turns in the magnet object hoop direction by having the magnetic pole of eight poles where N pole and the south pole are located in a line with each inside side by turns as shown in drawing 9. Rotation of the tubed magnet object 8 for every 1 pitch-angle **** N pole of 16 poles of the tubed magnet object 8, 16 pole piece 12a with which one iron core member 12 of a magneto coil 7 is equipped counters each **. The south pole of 16 poles of the tubed magnet object 8, The 1st opposite condition that 16 pole piece 12b with which the iron core member 12 of another side of a magneto coil 7 is equipped counters each **, Contrary to this 1st opposite condition, N pole of 16 poles of the tubed magnet object 8 and 16 pole piece 12b with which the iron core member 12 of another side of a magneto coil 7 is equipped counter each **. The south pole of 16 poles of the tubed magnet object 8, So that

the opposite condition of a magnet side magnetic pole and a coil side pole piece may change to the 2nd opposite condition that 16 pole piece 12a with which one iron core member 12 of a magneto coil 7 is equipped counters each **. By having carried out an array setup of a magnetic pole, a hub shell 2 rotates, the tubed magnet object 8 follows on rotating, and the 1st generator unit D1 - the 3rd generator unit D3 generate electricity to each **. That is, if the tubed magnet object 8 rotates and a magnet side magnetic pole and a coil side pole piece will be in said 1st opposite condition, the magnetic flux from the tubed magnet object 8 will be accepted in one pole piece 12a. And when boss section 12c like drawing 4 of both the iron core members 12 and 12 touches by the inside of a magneto coil 7, magnetic flux passes both the iron core member 12 to the direction of pole piece 12b of another side. That is, the magnetic flux from the tubed magnet object 8 passes a magneto coil 7 in the forward direction. If a magnet side magnetic pole and a coil side pole piece will be in said 2nd opposite condition, the magnetic flux from the magnet object 8 will pass a magneto coil 7 to hard flow by accepting the magnetic flux from the tubed magnet object 8 in pole piece 12b of another side, and passing both the iron core member 12 to the direction of one pole piece 12a. and the thing which the direction where the tubed magnet object 8 follows on rotating, a magnet side magnetic pole and a coil side pole piece switch to said 1st opposite condition and said 2nd opposite condition by turns, and magnetic flux passes a magneto coil 7 switches to the forward direction and hard flow -- the 1st generator unit D1 - the 3rd generator unit D3 -- power occurs in each magneto coil 7. the 1st generator unit D1 - the 3rd generator unit D3 -- each magneto coil 7 is electrically connected to a serial, and the power of the electrical potential difference higher than the power which the 1st generator unit D1 - the 3rd generator unit D3-generate-to-each--*--as-the-whole-generator-is-sent-out-from-said-lead-wire-9-namely,the-power-which--the 1st generator unit D1 - the 3rd generator unit D3 generate to each ** -- compounding -- the 1st generator unit D1 - the 3rd generator unit D3 -- synthetic power equipped with an electrical potential difference higher than the electrical potential difference which each generates is sent out as generated output.

[0009] If it is in the above-mentioned operation structure, the magnet object 8 is arranged to the periphery side of a magneto coil 7. If it compares with a magnet object arranging to the inner circumference side of a magneto coil and the tooth space for generator arrangement of the hub inside of the body thinks by this that it is the same, the difference of the outer diameter of a magneto coil 7 and a bore will be made into size, the number of turns of a coil will be made [many], and a higher generation-of-electrical-energy electrical potential difference will be obtained. Moreover, since it comes to equip the periphery side of a magneto coil 7 with pole pieces 12a and 12b, the die length and quantity in a coil hoop direction of pole pieces 12a and 12b are made into size, and the magnetic flux from the magnet object 8 can pass in favor of a magneto-coil 7 side.

[0010] If it is in the above-mentioned operation structure, the direction die length of a hub axis of the magnet object 8 is formed in the die length which results by the 3rd generator unit D3 from the 1st generator unit D1. namely, the same magnet object 8 -- the 1st generator unit D1 - the 3rd generator unit D3 -- simplification of structure is attained by using in common on the magnet object of each sake. In addition, the magnet object of its dedication may be carried out in preparation for each ** to the 1st generator unit D1 - the 3rd generator unit D3.

[0011] The die length L1 in the coil hoop direction by the side of the end face connected with the iron core member 12 of pole pieces 12a and 12b is formed in size from the die length L2 in the coil hoop direction by the side of a tip so that it may show clearly at drawing 7 to form the pole pieces 12a and 12b of said magneto coil 17. Namely, compare with making the same die length by the side of a end face, and die length by the side of a tip, and it carries out possible [of forming many pole pieces 12a and 12b on a par with a coil hoop direction]. And the path by the side of a pole piece end face for the magnetic flux which pole pieces 12a and 12b receive from the magnet object 8 to pass to a magneto-coil 7 side It becomes size considering the magnetic-flux receptacle area by the side of a pole piece tip, and the whole quantity of the magnetic flux which pole pieces 12a and 12b accept, or the amount near it has made it possible to pass a coil side.

[0012] [Other Example(s)]

it changes to the above-mentioned operation structure, and is shown in drawing 10 -- as -- the 1st generator unit D1 - the 3rd generator unit D3 -- it may connect with juxtaposition and each magneto coil 7 may be carried out. In this case, even if an open circuit occurs in any one of the 1st generator unit D1 - the 3rd generator units D3, or two, it becomes possible to take out the generated output by other generator units which have not been disconnected, and to carry out by continuing lighting.

[0013] In addition, although a sign is described in order to make contrast with a drawing convenient at the term of a utility model registration claim, this design is not limited to the configuration of an accompanying drawing by this entry.

[Translation done.]

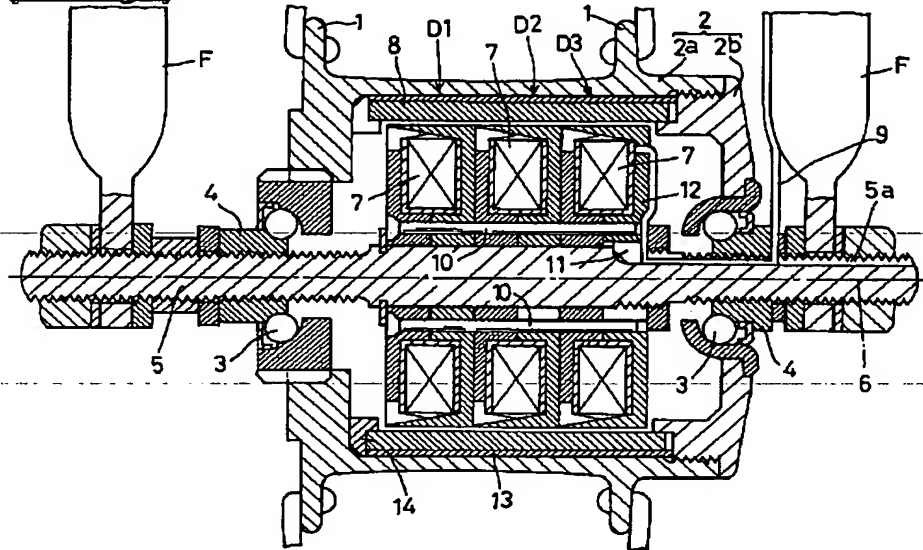
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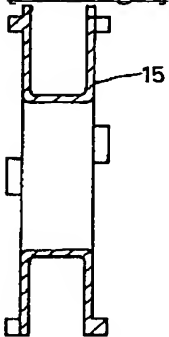
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DRAWINGS

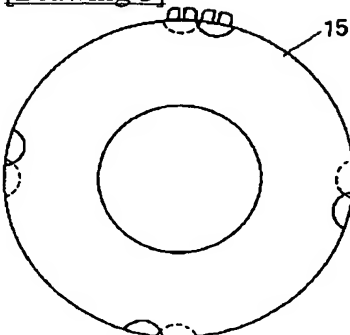
[Drawing 1]



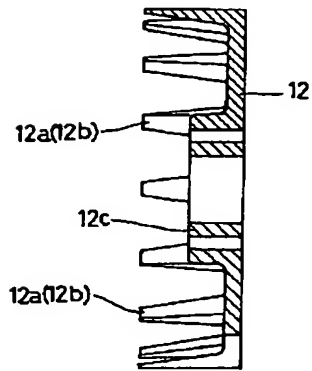
[Drawing 2]



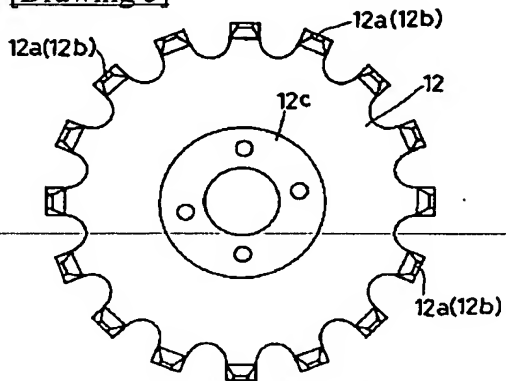
[Drawing 3]



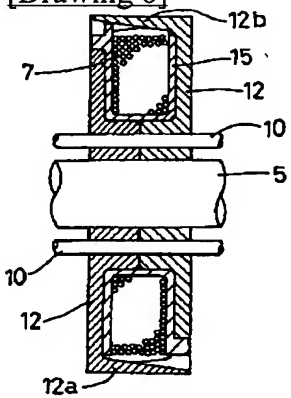
[Drawing 4]



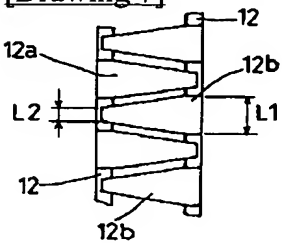
[Drawing 5]



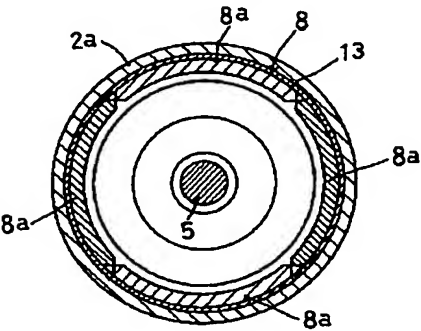
[Drawing 6]



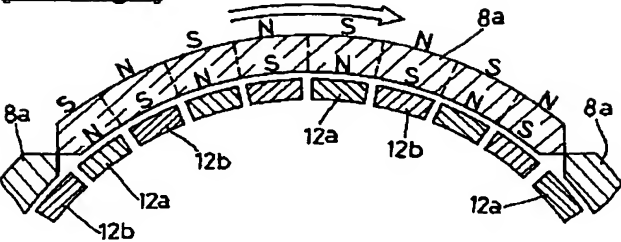
[Drawing 7]



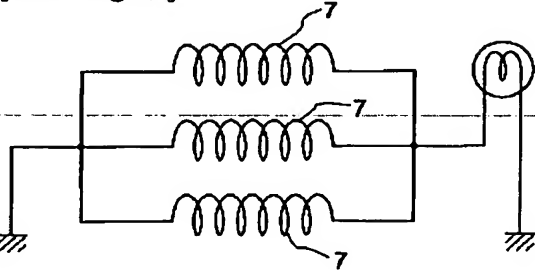
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]

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